



User Manual

020-101375-04

# **D4KLH60/Mirage 4KLH**

**CHRISTIE®**

## NOTICES

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### WARRANTY

Products are warranted under Christie's standard limited warranty, the complete details of which are available by contacting your Christie dealer or Christie. In addition to the other limitations that may be specified in Christie's standard limited warranty and, to the extent relevant or applicable to your product, the warranty does not cover:

- a. Problems or damage occurring during shipment, in either direction.
- b. Projector lamps (See Christie's separate lamp program policy).
- c. Problems or damage caused by use of a projector lamp beyond the recommended lamp life, or use of a lamp other than a Christie lamp supplied by Christie or an authorized distributor of Christie lamps.
- d. Problems or damage caused by combination of a product with non-Christie equipment, such as distribution systems, cameras, DVD players, etc., or use of a product with any non-Christie interface device.
- e. Problems or damage caused by the use of any lamp, replacement part or component purchased or obtained from an unauthorized distributor of Christie lamps, replacement parts or components including, without limitation, any distributor offering Christie lamps, replacement parts or components through the internet (confirmation of authorized distributors may be obtained from Christie).
- f. Problems or damage caused by misuse, improper power source, accident, fire, flood, lightening, earthquake or other natural disaster.
- g. Problems or damage caused by improper installation/alignment, or by equipment modification, if by other than Christie service personnel or a Christie authorized repair service provider.
- h. Problems or damage caused by use of a product on a motion platform or other movable device where such product has not been designed, modified or approved by Christie for such use.
- i. Problems or damage caused by use of a projector in the presence of an oil-based fog machine or laser-based lighting that is unrelated to the projector.
- j. For LCD projectors, the warranty period specified in the warranty applies only where the LCD projector is in "normal use" which means the LCD projector is not used more than 8 hours a day, 5 days a week.
- k. Except where the product is designed for outdoor use, problems or damage caused by use of the product outdoors unless such product is protected from precipitation or other adverse weather or environmental conditions and the ambient temperature is within the recommended ambient temperature set forth in the specifications for such product.
- l. Defects caused by normal wear and tear or otherwise due to normal aging of a product.

The warranty does not apply to any product where the serial number has been removed or obliterated. The warranty also does not apply to any product sold by a reseller to an end user outside of the country where the reseller is located unless (i) Christie has an office in the country where the end user is located or (ii) the required international warranty fee has been paid.

The warranty does not obligate Christie to provide any on site warranty service at the product site location.

### PREVENTATIVE MAINTENANCE

Preventative maintenance is an important part of the continued and proper operation of your product. Failure to perform maintenance as required, and in accordance with the maintenance schedule specified by Christie, will void the warranty.


### REGULATORY

The product has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the product is operated in a commercial environment. The product generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of the product in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user's own expense.

#### CAN ICES-3 (A) / NMB-3 (A)

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The product is designed and manufactured with high-quality materials and components that can be recycled and reused. **This symbol**  means that electrical and electronic equipment, at their end-of-life, should be disposed of separately from regular waste. Please dispose of the product appropriately and according to local regulations. In the European Union, there are separate collection systems for used electrical and electronic products. Please help us to conserve the environment we live in!

# Table of Contents

<b>Introduction</b>	<b>7</b>
General safety precautions	7
AC/power precautions	8
Christie Laser Projection System components	8
<b>Laser Safety Precautions</b>	<b>10</b>
Laser module laser safety labels	11
LM Rack laser safety labels	13
Projector laser safety labels	14
Laser module status lights	17
LM Rack safety features	18
Projector safety features	19
Nominal ocular hazard distance	20
<b>Operate the Projector</b>	<b>22</b>
Touch Panel Controller	22
Turn the system on	22
Test the interlocks	23
Test the key switch	23
Test the Laser Rack emergency stop	23
Test the projector emergency stop	24
Adjust the lens	24
Calibrate the lens motors	24
Select a channel	24
Orient the screen image	24
Turn the projector off	25
Turn the system off in an emergency	25
<b>Status and Settings</b>	<b>26</b>
Tabs	26
Menu tab details	26
Status tab details	27
<b>Add Devices</b>	<b>28</b>
Connect devices to the projector	28
Connect a video source via DisplayPort	28
Connect a video source via 3G-SDI	29

- Connect a video source using HDMI ..... 30
- Connect a video source via DVI ..... 31
- Four-port input video quadrant mappings ..... 31
- Connect devices to the 3D sync ports ..... 32
- Connect a computer or server ..... 32
- Ethernet Setup ..... 33
- View 3D Content ..... 34**
  - Set up Mirage 4KLH projectors for 3D ..... 34
    - 3D requirements ..... 34
    - Active stereo 3D configuration ..... 35
    - Passive stereo 3D configuration ..... 36
    - 3D system timing ..... 36
    - 3D input video configurations ..... 37
  - Set up a single Mirage 4KLH to display 3D content ..... 37
    - Confirm the emitter setup ..... 37
    - Configure the projector for the 3D source ..... 38
- Laser Bank Control Application ..... 39**
  - Start the laser bank control application ..... 39
  - Check laser module status ..... 39
  - Retrieve log file ..... 40
  - Change user levels ..... 40
  - Create a channel configuration ..... 41
  - Log out of your current user level ..... 41
- Maintenance ..... 42**
  - Shut down for maintenance ..... 42
  - Check the coolant level ..... 42
  - Inspect and Clean Optics ..... 42
    - Clean the Lens ..... 43
  - Inspect the Card Cage Filter ..... 43
  - Cleaning a Washable Filter ..... 44
  - Replace the Lens ..... 44
- Troubleshooting ..... 46**
  - Projector functionality ..... 46
  - Display issues ..... 47
  - Laser module functionality ..... 48

<b>Projector Specifications</b> .....	<b>50</b>
Power requirements .....	50
D4KLH60 signal connectivity .....	51
Mirage 4KLH signal connectivity .....	51
Physical specifications .....	53
Operating position .....	54
Operating environment .....	54
Non-operating environment .....	54
Projection lens compatibility .....	55
Accessories .....	55
Standard .....	55
Optional .....	55
Third-party accessories .....	55
Replacement air filters .....	56
<b>Laser Module Specifications</b> .....	<b>57</b>
Power requirements .....	57
Physical specifications .....	57
Operating environment .....	57
Non-operating environment .....	58
Accessories .....	58
Included .....	58
Additional .....	58
Optional .....	58
<b>Laser Rack Specifications</b> .....	<b>59</b>
Power requirements .....	59
Physical specifications .....	60
LM Rack (Full) .....	60
LM Rack (Half) .....	60
Operating environment .....	61
Non-operating environment .....	61
<b>Regulatory</b> .....	<b>62</b>
Safety .....	62
Laser safety .....	62
Electro-magnetic compatibility .....	62
Environmental .....	62
Certification .....	63

# Introduction

This manual is intended for professionally trained operators of the Christie Laser Projection System. These operators are qualified to replace the lens and external air filters, but should not attempt to install or service the projector.

**⚠ WARNING**

Failure to comply with the following could result in death or serious injury.

- The components of the Christie Laser Projection System are designed and certified to work together as a unit. Christie components should never be used with third-party components. Use of non-Christie components with Christie systems may pose safety concerns and void your warranty.
- Only Christie qualified technicians who are knowledgeable about the hazards associated with laser use, high-voltage and high temperatures generated by the projector are authorized to assemble, install, and service the Christie Laser Projection System.

## General safety precautions

When working with the projector, observe these important safety rules to avoid personal injury or damage to the projector:

**⚠ DANGER**

When accessing a restricted access location for projector service or maintenance, avoid exposure to the projector beam path by making sure to

- Turn the projector power off and disconnect the projector from AC power.
- Rotate the Beam Stop to Closed.

Failure to comply results in death or serious injury.

**⚠ WARNING**

Failure to comply with the following could result in death or serious injury.

- The projection head must use Christie laser modules and Laser Rack.
- Never look directly into the projector lens. The extremely high brightness can cause permanent eye damage.
- FIRE HAZARD! Keep hands, clothes, and all combustible material away from the concentrated light beam of the projector.

**⚠ CAUTION**

Position all cables where they cannot contact hot surfaces or be pulled or tripped over. Failure to comply could result in minor or moderate injury.

**NOTICE**

- This projector must be operated in an environment that meets the operating range specification. See [Projector Specifications](#) on page 49.
- When using the Christie laser projection system, your installation must comply with all federal, state, and municipal safety regulations.

## AC/power precautions

**⚠ WARNING**

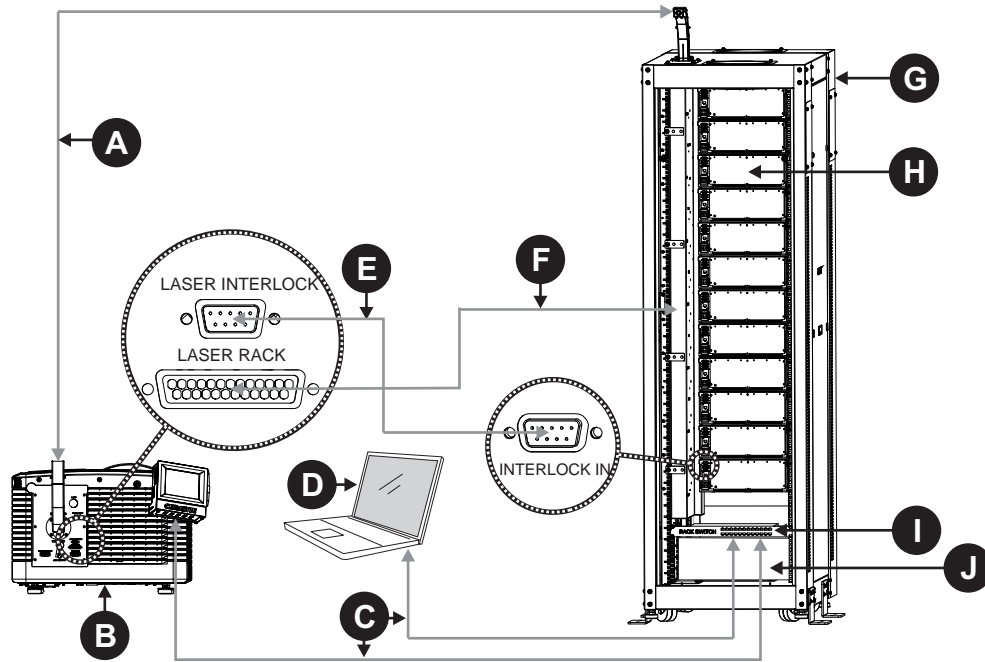
Failure to comply with the following could result in death or serious injury.

- Use only the AC power cord provided with the projector. Do **not** attempt operation if the AC supply is not within the specified voltage and power range, as specified on the license label.
- As a safety feature the projector is equipped with a three-wire plug with a third (grounding) pin. If you cannot insert the plug into the outlet, contact an electrician to have the outlet replaced. Do **not** defeat the safety purpose of the grounding-type plug.
- Loose cables provide a trip or fire hazard. Position all cables where they cannot contact hot surfaces, be pulled, or be tripped over.
- Damaged cables provide a fire hazard. Do not allow anything to rest on the power cord. Never operate the projector if a cable appears damaged.
- Overloaded power outlets and extension cords provide a fire and shock hazard. Do not overload power outlets or extension cords.
- Disconnect projector from AC before opening any enclosure.

**⚠ CAUTION**

Only qualified service technicians are permitted to open projector enclosures and only if the projector is disconnected from AC power. Failure to comply could result in minor or moderate injury.

## Christie Laser Projection System components



<b>A</b>	Fiber optic bundle Transmits the collected laser light to the projector.
<b>B</b>	Projector Modulates light from the laser modules and passes it through a projection lens to produce the image on the screen.

<b>C</b>	Ethernet cables Connects the laser bank manager and the projector to the network.
<b>D</b>	Laser bank manager Runs the laser bank control application that manages the laser modules.
<b>E</b>	Interlock cable (9-pin) Carries the signal for the emergency stop, key switch, and laser modules to verify a safe connection between the laser modules and the projector.
<b>F</b>	Interlock cable (25-pin) Carries the signal for the Manual Reset button to the projector.
<b>G</b>	LM Rack (Full/Half) (rear side shown) A full and a half rack are available. The LM Rack Full (shown) accommodates up to 12 laser modules, the power distribution unit, and the Laser system network switch and equipped with a key switch and an emergency stop for safety. The LM Rack Half accommodates up to 7 laser modules.
<b>H</b>	Laser module Generates laser light for the projector.
<b>I</b>	Laser system network switch Provides Ethernet connection to laser modules, laser bank manager, and projector.
<b>J</b>	Power distribution unit Contains rectifiers and breakers to provide DC power to laser modules.



# Laser Safety Precautions

This projector is intended for use in a non-cinema environment.

The Christie Laser Projection System components have laser classifications, as outlined by the International Electrotechnical Commission (IEC), ranging from Class 1 to Class 4. Immediate skin hazard and eye hazard can occur from exposure to either the direct or specular reflected beam. This may pose a fire hazard or a diffuse reflection hazard.

- Wavelength: 435 nm to 660 nm
- Beam divergence: 0.1 rad to 0.96 rad, lens dependent
- Pulse pattern: Continuous Wave (CW).
- Maximum output: < 10 W

** DANGER**

Failure to comply with the following results in death or serious injury.

- This product must be installed within a restricted access location which is normally inaccessible by the general public, including workers, visitors, and residents in the immediate vicinity, by means of engineering or administrative control measures but is accessible to authorized personnel that have had specific safety training.
- The installation setup must prevent access to the nominal ocular hazard area.

** WARNING**

Failure to comply with the following could result in death or serious injury.

- A qualified technician is required for all installations.
- Never look into the end of a fiber optic cable while the device is operational. Laser radiation can be harmful to the human eye and injury may occur.
- Invisible infrared LED radiation might be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.
- Lasers contain a high energy density. These can be dangerous for skin tissue as well as pose an electrical, chemical, and non-ionizing radiation hazard.
- Do not operate the Christie Laser Projection System with the laser rack access panels removed.

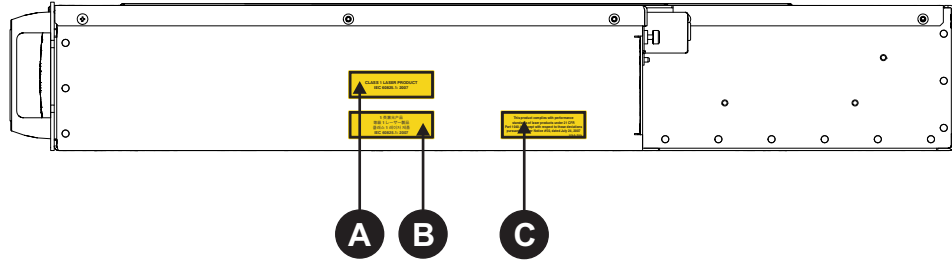
** CAUTION**

Failure to comply with the following could result in minor or moderate injury.

- Turn the laser module breakers off before inspecting the fiber optic cable.
- Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

## Laser module laser safety labels

This diagram shows the laser safety labels on the right side of the laser module.



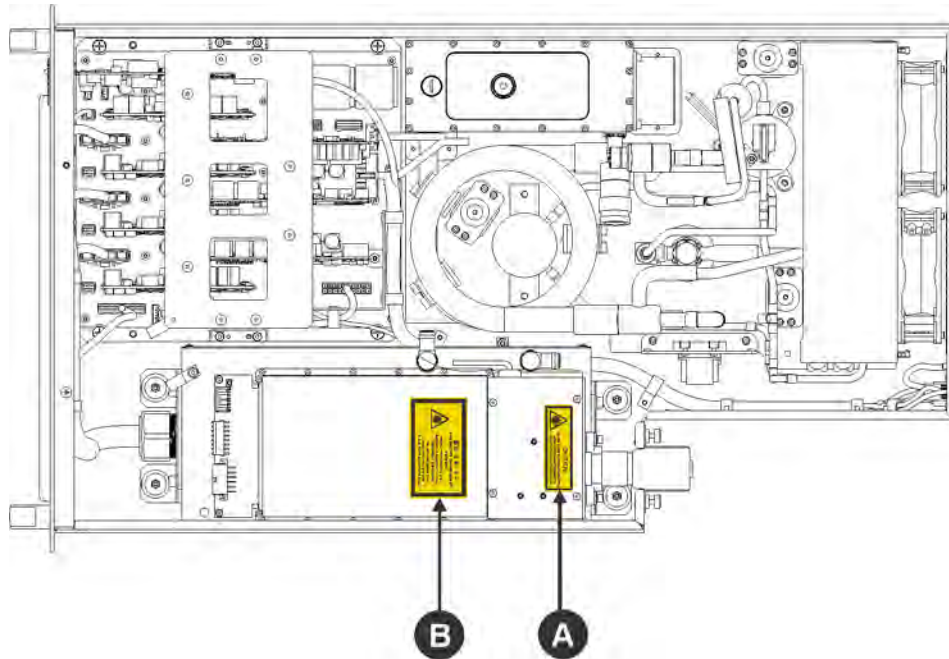
<p><b>A</b></p>		<p>CLASS 1 LASER PRODUCT IEC630825-1: 2007</p>
<p><b>B</b></p>		<p>Translation of label A in French, Chinese, Japanese, and Korean</p>
<p><b>C</b></p>		<p>Christie Digital Systems Canada Inc. 809 Wellington Street North Kitchener, ON N2G 4Y7 Canada</p> <p>This product complies with performance standards of laser products under 21 CFR Part 1040.10 except with those deviations pursuant to Laser Notice #50, dated July 24, 2007 U.S.A. Only</p>



This diagram shows labels below the laser module cover.



Do not remove the laser module cover for maintenance or service. The laser module must be repaired at a Christie Digital Factory. Removing the cover voids the warranty. Failure to comply could result in death or serious injury.

- Wavelength: 435 nm to 660 nm
- Beam divergence: 10 mrad
- Pulse Pattern: Continuous Wave
- Maximum power: 64 W



<p><b>A</b></p>		<p>CAUTION CLASS 4 LASER RADIATION WHEN OPEN AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION</p>
<p><b>B</b></p>		<p>Translation of label A in French, Chinese, Japanese, and Korean</p>

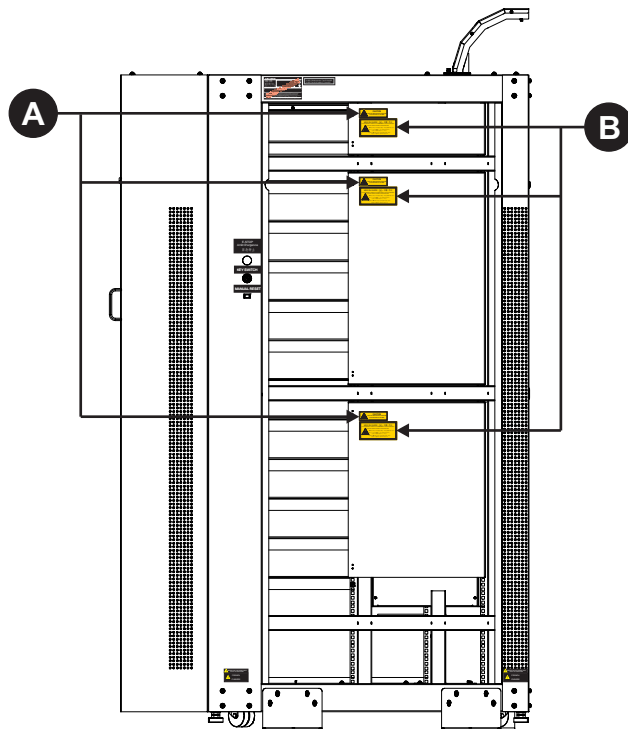
# LM Rack laser safety labels

This diagram identifies laser safety labels on the laser rack underneath the operator side door.



The laser rack contains a Class 3B laser product. Do not disassemble components in the laser rack. Disassembling components voids the warranty. Failure to comply result in death or serious injury.

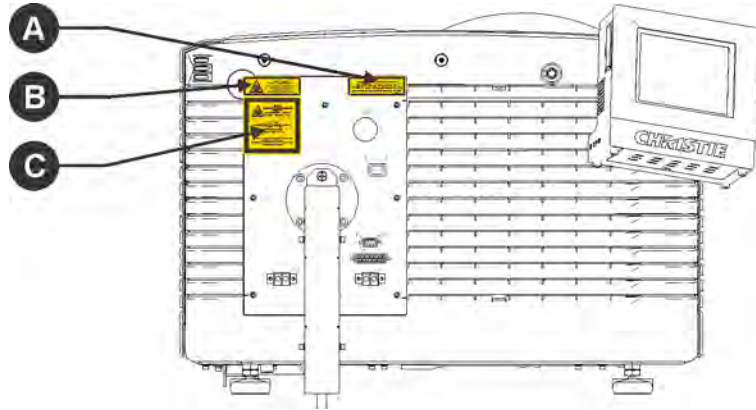
- Wavelength: 435 nm to 660 nm
- Beam divergence: 260 mrad
- Pulse Pattern: Continuous Wave
- Maximum power: 100 mW



<p><b>A</b></p>		<p>CAUTION CLASS 3B LASER RADIATION WHEN OPEN AVOID EXPOSURE TO BEAM</p>
<p><b>B</b></p>		<p>Translation of label A in French, Chinese, Japanese, and Korean</p>

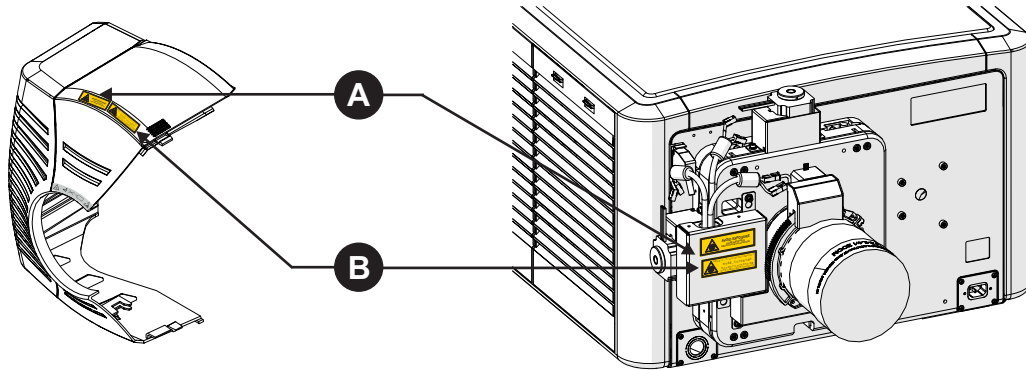
# Projector laser safety labels

This diagram shows the laser safety labels on the operator side of the projector.



<p><b>A</b></p>		<p>Christie Digital Systems Canada Inc. 809 Wellington Street North Kitchener, ON N2G 4Y7 Canada</p> <p>This product complies with performance standards of laser products under 21 CFR Part 1040.10 except with respect to those deviations pursuant to Laser Notice #50, dated July 24, 2007 U.S.A. Only</p>
<p><b>B</b></p>		<p>LASER RADIATION AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATIONS CLASS 4 LASER PRODUCT 435nm-660nm &lt;10W CLASSIFIED PER IEC 60825-1 2007</p>
<p><b>C</b></p>		<p>Translation of label B in French, Chinese, Japanese, and Korean</p>

This diagram shows the laser safety labels on the lens side of the projector.



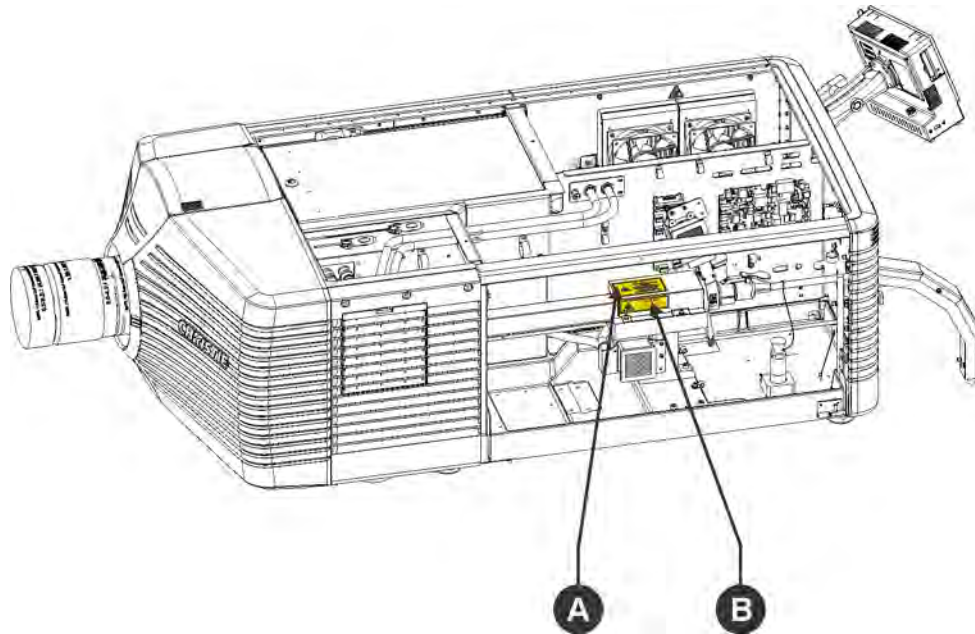
<p><b>A</b></p>		<p>AVOID EXPOSURE LASER RADIATION IS EMITTED FROM THIS APERTURE</p>
<p><b>B</b></p>		<p>Translation of label A in French, Chinese, Japanese, and Korean</p>



This diagram shows the laser safety labels that appear on the fiber bundle relay optics.



Do not remove the protective housing. Failure to comply could result in death or serious injury.

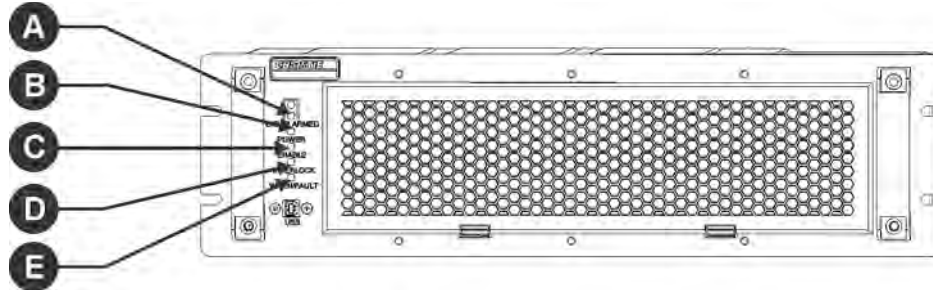
- Wavelength: 435 nm to 660 nm
- Beam divergence: 260 mrad
- Pulse Pattern: Continuous Wave
- Maximum power: 775 W



<p><b>A</b></p>		<p>CAUTION CLASS 4 LASER RADIATION WHEN OPEN AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION</p>
<p><b>B</b></p>		<p>Translation of label A in French, Chinese, Japanese, and Korean</p>

## Laser module status lights

This diagram shows the location of the laser module LED status lights. The laser module is off when the Power LEDs are off.

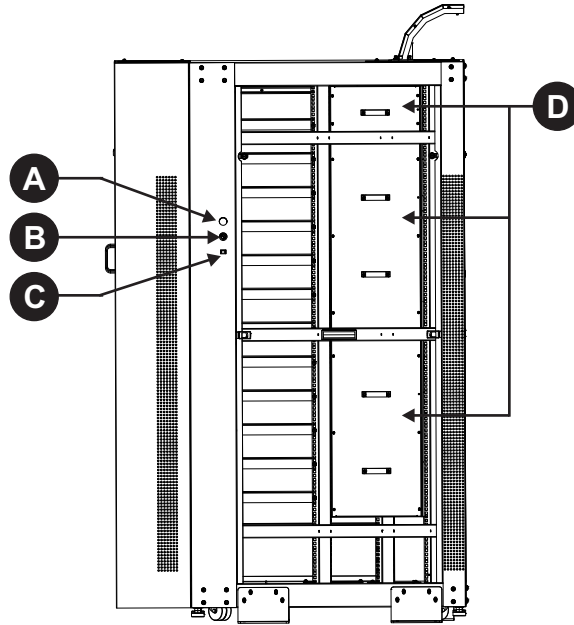


LED	Red	Green	Amber	White
<b>A</b> LASER ARMED				Armed (Interlocks OK, lasers are charged; may or may not be emitting)
<b>B</b> POWER		On (lasers are active and emitting)	Standby (Chiller and fans running)	
<b>C</b> ENABLE				Lasers are active and emitting
<b>D</b> INTERLOCK	Not blinking: external interlock failure Blinking: IR interlock failure	OK		
<b>E</b> WARN/FAULT	Fault (laser module does not turn on or has turned off)	No fault	Warning (laser module is on but a laser temperature or voltage is above the warning threshold)	



## LM Rack safety features

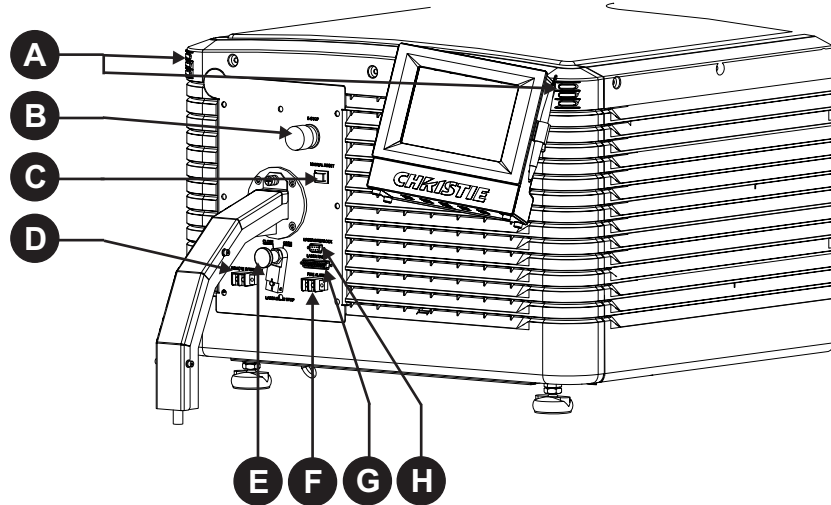
This diagram shows the laser safety features on the operator side of the laser rack.



<b>A</b>	Emergency stop To shut down the laser modules in an emergency, press <b>E-stop</b> .
<b>B</b>	Key switch Key must be present for the system to run. Laser radiation is not accessible when the key is removed.
<b>C</b>	Manual reset Press <b>Reset</b> following a system restart.
<b>D</b>	Fiber carrier panel When any panel is removed, the laser interlock opens and the lasers cannot be armed.

## Projector safety features

This diagram shows the location of the laser safety features on the projector.



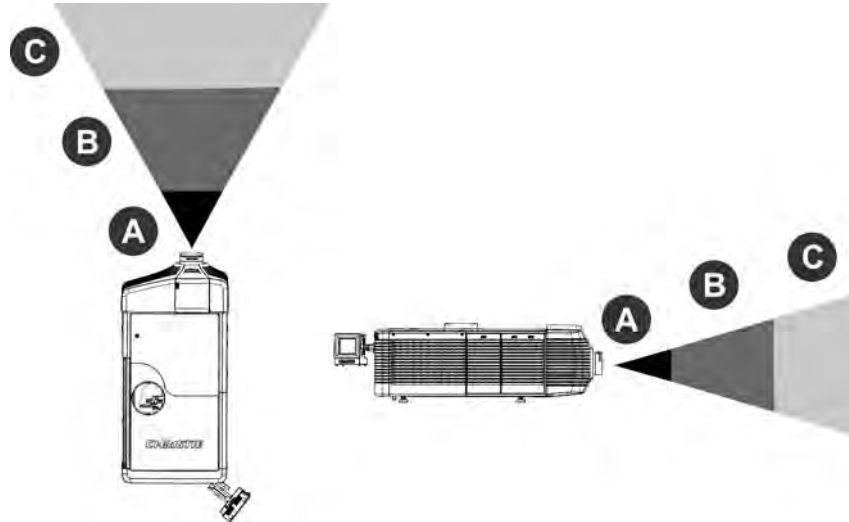
<b>A</b>	Laser emission indicator lights Bottom two LEDs on both sides emit white light when the lasers are armed. They are off when the lasers are not armed.
<b>B</b>	Emergency stop Turns off the laser modules off in an emergency.
<b>C</b>	Manual reset Re-arms the system after a system shutdown. Pressing <b>Manual Reset</b> indicates it is safe to arm the lasers.
<b>D</b>	Remote interlock Enables remote shutdown of the projector (optional).
<b>E</b>	Laser beam stop Blocks the laser light path. Rotate the beam stop to <b>Closed</b> when performing service or maintenance on the projector. The laser projector system cannot be armed when the laser beam stop is closed.
<b>F</b>	Fire alarm Enables the projector to be connected to the facility fire alarm system (optional). When the alarm is activated, the laser modules turn off.
<b>G</b>	LM Rack (interlock) Connects the projector to the laser rack.
<b>H</b>	Laser interlock Connects the projector to the laser modules. When the interlock is tripped, accessible radiation is reduced below the maximum permissible exposure (MPE) level.

## Nominal ocular hazard distance



The installation setup must prevent access to the nominal ocular hazard area. Failure to comply results in death or serious injury.

The nominal ocular hazard distance (NOHD) is the distance from the projector where the light exceeds the maximum permissible exposure (MPE) on the eye and eye injuries can occur. The Skin Nominal Hazard Zone (SNHZ) is the area where skin burns are possible. This diagram illustrates the typical SNHZ (A), the NOHD (A + B), and the area (C) that is within permissible limits:



Hazard calculations are dependent on the number of light modules and the lens installed. This table lists hazard distances for Christie projector lenses with the zoom adjusted to its most hazardous position. Contact Christie support for assistance calculating hazard distances specific to your installation.

Light Modules	Projection Lens	4K Throw Ratio	Extended Source NOHD (m)	Skin NHZ (m)
7	1.25-1.45 DLPCine HB Zoom Lens (108-274101-01)	1.31:1	1.65	0.50
12	1.25-1.45 DLPCine HB Zoom Lens (108-274101-01)	1.31:1	2.8	0.65
7	1.25-1.83 DLPCine HB Zoom Lens (108-342100-01)	1.66:1	2.05	0.60
12	11.25-1.83 DLPCine HB Zoom Lens (108-342100-01)	1.66:1	3.50	0.80
7	1.45-2.05 DLPCine HB Zoom Lens (108-335102-01)	1.86:1	2.30	0.70
12	1.45-2.05 DLPCine HB Zoom Lens (108-335102-01)	1.86:1	3.90	0.80
7	1.6-2.4 DLPCine HB Zoom Lens (108-336103-01)	2.17:1	2.65	0.75
12	1.6-2.4 DLPCine HB Zoom Lens (108-336103-01)	2.17:1	4.55	1.05
7	1.8-3.0 DLPCine HB Zoom Lens (108-337104-01)	2.71:1	3.30	0.80
12	1.8-3.0 DLPCine HB Zoom Lens (108-337104-01)	2.71:1	5.65	1.30

Light Modules	Projection Lens	4K Throw Ratio	Extended Source NOHD (m)	Skin NHZ (m)
7	2.15-3.6 DLPCine HB Zoom Lens (108-338105-01)	3.26:1	3.95	1.20
12	2.15-3.6 DLPCine HB Zoom Lens (108-338105-01)	3.26:1	6.80	1.55
7	3.0-4.3 DLPCine HB Zoom Lens (108-278101-01)	3.89:1	4.70	1.40
12	3.0-4.3 DLPCine HB Zoom Lens (108-278101-01)	3.89:1	8.05	1.85
7	4.3-6.0 DLPCine HB Zoom Lens (108-279101-01)	5.43:1	6.55	2.00
12	4.3-6.0 DLPCine HB Zoom Lens (108-279101-01)	5.43:1	11.25	2.60
7	5.5-8.0 DLPCine HB Zoom Lens (108-280101-01)	7.24:1	8.75	2.65
12	5.5-8.0 DLPCine HB Zoom Lens (108-280101-01)	7.24:1	14.95	3.45

This table lists hazard distances for Christie projector high contrast lenses with the zoom adjusted to its most hazardous position.

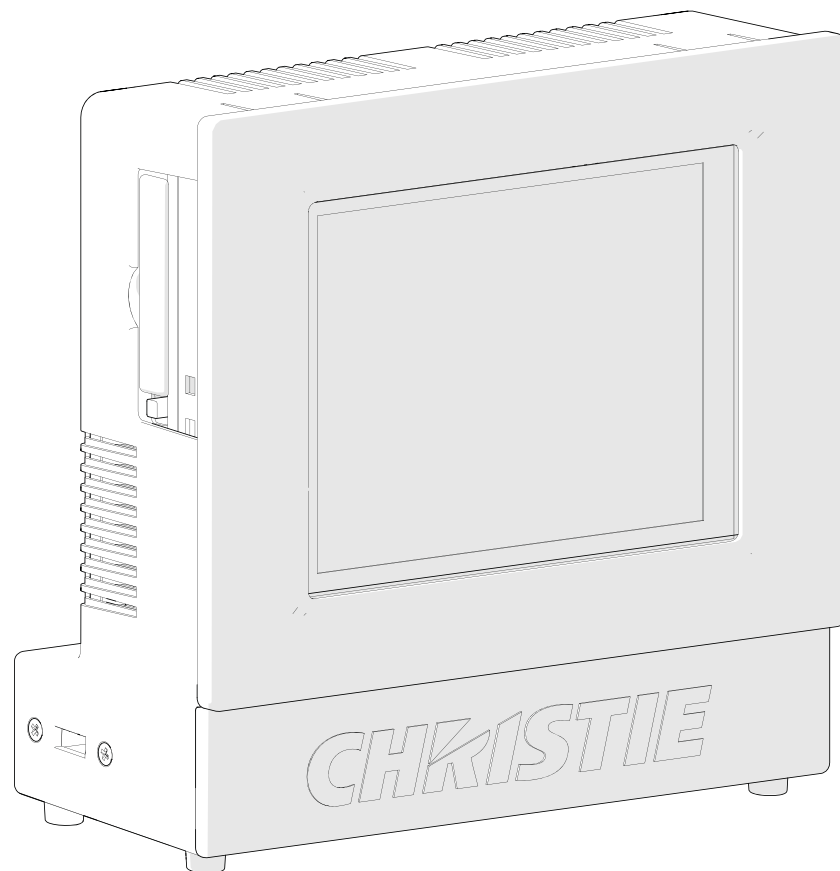
Light Modules	Projection Lens	4K Throw Ratio	Extended Source NOHD (m)	Skin NHZ (m)
7	1.13-1.66:1 DLPCine HC Zoom Lens (108-400105-01)	1.66:1	2.25	0.60
12	1.13-1.66:1 DLPCine HC Zoom Lens (108-400105-01)	1.66:1	3.85	0.80
7	1.31-1.85:1 DLPCine HC Zoom Lens (108-401106-01)	1.86:1	2.50	0.70
12	1.31-1.85:1 DLPCine HC Zoom Lens (108-401106-01)	1.86:1	4.30	0.90
7	1.45-2.17:1 DLPCine HC Zoom Lens (108-402107-01)	2.17:1	2.95	0.80
12	1.45-2.17:1 DLPCine HC Zoom Lens (108-402107-01)	2.17:1	5.00	1.05
7	1.63-2.71:1 DLPCine HC Zoom Lens (108-403108-01)	2.71:1	3.65	1.00
12	1.63-2.71:1 DLPCine HC Zoom Lens (108-403108-01)	2.71:1	6.25	1.30
7	1.95-3.26:1 DLPCine HC Zoom Lens (108-404109-01)	3.26:1	4.35	1.20
12	1.95-3.26:1 DLPCine HC Zoom Lens (108-404109-01)	3.26:1	7.50	1.55

# Operate the Projector

This section describes how to operate the projector.

## Touch Panel Controller

The touch panel controller (TPC) is a touch-sensitive screen used to control the projector. You can use the TPC to turn the projector and the laser modules on or off, select channels, and view status information. The TPC is mounted on the rear of the projector and can be adjusted to improve the viewing angle. Use the USB port on the side of the TPC to download log files and install software upgrades. You can disconnect the TPC from the projector and you can control the projector from a maximum distance of 30 meters (98 feet) with an optional cable.



## Turn the system on

1. Check the interlock cables are securely attached to the laser modules.
2. Check the interlock cable to the projector is securely attached.

3. Check the Ethernet cable between the projector and the laser system network switch is securely attached.
4. Check the Ethernet cable between the laser bank manager and the laser system network switch is securely attached.
5. Turn on the laser bank manager.
6. Turn on the circuit breaker on the projector baseplate under the front lens-side corner.
7. If the emergency-stop button on either the Laser Rack or the projector is activated, release it by turning the button clockwise.
8. Turn the Beam Stop on the projector to **OPEN**.
9. Turn the Laser Rack key switch on.  
The key must be in the switch at all times.
10. Turn on the laser system network switch at the rear of the Laser Rack.
11. Turn on the breakers (one per laser module) in the power distribution unit in the front of the Laser Rack.
12. Press **MANUAL RESET** on the side of the Laser Rack or on the back of the projector.  
Wait for a few seconds for the interlock to close and the laser emission status lights on the rear of the projector to turn on.
13. To turn on the projector, on the **Home** tab on the touch panel controller (TPC), tap **Power**.
14. Verify the status lights on the back of the projector and the front of the laser modules are white.

## Test the interlocks

Once the projector is running, ensure the safety interlocks are functioning.



Before displaying an image from the projector, test the three interlock devices. Every time the interlock is activated, the laser modules turn off. Failure to comply could result in death or serious injury.

## Test the key switch

1. Turn the key switch on the Laser Rack off.
2. Check the status lights on the back of the projector are off.
3. Turn on the key switch.
4. Press **Manual Reset** on the projector.

## Test the Laser Rack emergency stop

1. Press the emergency stop button on the Laser Rack.
2. Check the status lights on the back of the projector are off.

3. To release the E-stop, rotate the knob clockwise.
4. Press **Manual Reset** on the projector.

## Test the projector emergency stop

1. Press the emergency stop button on the projector.
2. Check the status lights on the back of the projector are off.
3. To release the E-stop, rotate the knob clockwise.
4. Press **Manual Reset** on the projector.

## Adjust the lens

Electronic focus, zoom, and offsets can be adjusted electronically.

1. Tap the **Lens** tab on the TPC.
2. To shift the position of the lens vertically, tap the up and down arrows.
3. To shift the position of the lens horizontally, tap the left and right arrows.
4. To return the lens to the home position, tap **Reset to Home Position**.
5. To focus the image, under Focus tap the up and down arrows.
6. To zoom in or out, under Zoom, tap the up and down arrows.

## Calibrate the lens motors



Reset and calibrate lens motors after

- changing a lens
- the projector is moved or jostled
- the lens motors are physically moved using the manual adjustment knobs

1. On the Lens tab, tap **Calibrate Lens**.

## Select a channel

Channel files contain pre-configured optimum processing and display settings for different sources.

1. On the **Home** tab on the TPC, from the Channel list, select the channel you want.

## Orient the screen image

1. To display the a white test pattern, on the Home tab in the Pattern list, select **Flat White**.
2. Tap **Menu > Configuration > Image Orientation**.
3. Select the orientation you want from the list.

## Turn the projector off

1. On the touch panel controller, tap the **Home** tab.
2. Tap the **Power** button.
3. If performing maintenance on the projector or removing the outer skins, disconnect the projector from AC power. See [Shut down for maintenance on page 41](#).

## Turn the system off in an emergency

1. To shut down the system in an emergency, press E-stop on the back of the projector (see [Projector safety features](#) on page 18) or on the operator side of the Laser Rack (see [LM Rack safety features](#) on page 17).

The laser modules turn off.



# Status and Settings

This section provides information on displaying the status of the projector states and on displaying and changing projector settings.

## Tabs

The touch panel controller (TPC) windows are structured across a series of six tabs on the top of the display.

Tab	Description
<b>Home</b>	Quickly add and select channels, display test patterns, activate the shutter, and control the projector power.
<b>Menu</b>	Access the projector controls and settings for <ul style="list-style-type: none"> <li>• Image settings</li> <li>• Configuration</li> <li>• Communications</li> <li>• General</li> </ul>
<b>Lens</b>	Adjust the lens offset, focus, and zoom motors. These controls can be adjusted either by tapping the desired directional arrow or by entering a numerical value. Calibrate the lens motors. See <a href="#">Calibrate the lens motors</a> on page 23.
<b>Status</b>	Display the status of projector control states and settings. The status windows are for reporting purposes and all fields are read-only. See <a href="#">Status tab details</a> on page 26.
<b>Admin</b>	Display log files, access the interrogator, backup settings, restore settings, and perform upgrade procedures.
<b>About</b>	Display legal information regarding software licensing and usage agreements.

## Menu tab details

Menu	Description
<b>Configuration</b>	Adjust the projected image orientation and the projector Ethernet settings. <ul style="list-style-type: none"> <li>• <b>Color Correction</b></li> <li>• <b>Image Orientation</b> - See <a href="#">Orient the screen image</a> on page 23.</li> <li>• <b>EDID Window Manager</b></li> <li>• <b>EDID timing</b></li> <li>• <b>Diagnostics</b></li> </ul>

## Status tab details

Window	Description
<b>Alarms</b>	Display the location and the fault condition for any active alarms.
<b>Configuration</b>	Display the projector model, serial number, output resolution, and build date.
<b>Cooling</b>	Display the status of the liquid cooling module and the cooling fans.
<b>Lamp Info</b>	Display the laser bank manager version, state, and status, the laser system interlock, and the laser light levels detected by the color sensor board.
<b>Serials</b>	Display the serial numbers for all electrical components, such as main control board, backplane, image processor, formatter boards, lens motor board, and primary and secondary environmental boards (EVB).
<b>Signal</b>	Display the status of the four option card slots.
<b>System</b>	Display system hardware control settings, such as projector hours, pitch/roll, lens motor status, and built-in self test.
<b>Temperatures</b>	Display the operating temperatures as reported by the internal thermal sensors.
<b>Versions</b>	Display the hardware and software versions for all electrical components, such as main control board, backplane, image processor, formatter boards, option cards, primary and secondary EVBs, lens motor control board, interlock generator board (IGB), and color sense (csense) board.

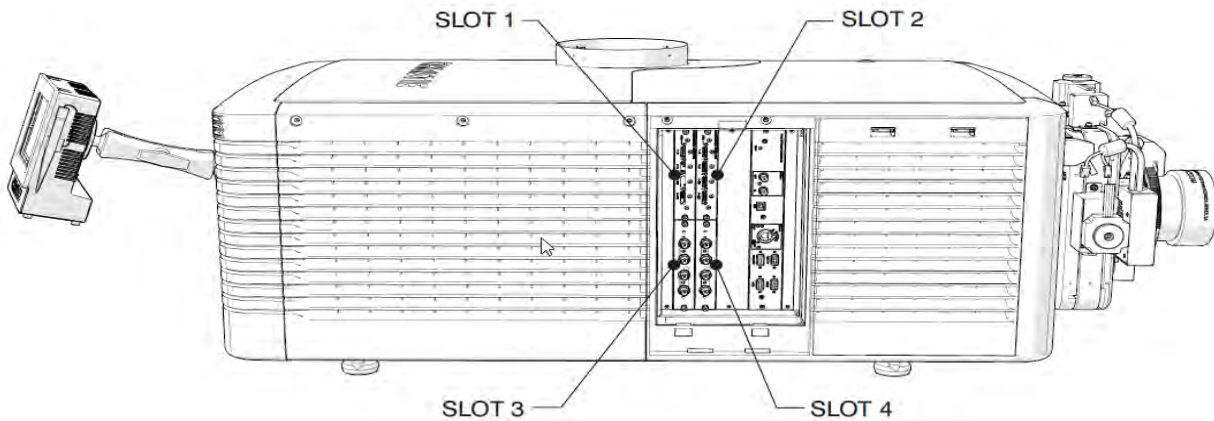
# Add Devices

This section describes input connections and how to connect devices to the projector.

## Connect devices to the projector

1. To access the communication ports, remove the access panel.
2. Route all cables along the channels located on the bottom of the projector and up through the opening in the frame to the communication port.
3. Replace the access panel to ensure server and source connections remain secure.

Input signal devices are connected to the video option cards and communication devices are connected at the MCPUC panel.



## Connect a video source via DisplayPort

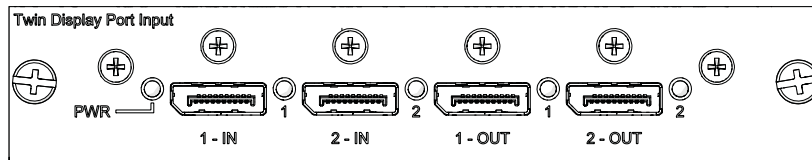
The Twin DisplayPort Input Card (TDPIC) accepts digital video data from the DisplayPort sources. Various input configurations are supported.

Input Configuration	Description	Requirements
Four-Port	Enables connection of four DisplayPort cables to two TDPIC cards (using the 1-IN and 2-IN inputs of two cards in slots 1 and 2, or in slots 3 and 4). Each DisplayPort input supplies one quadrant of a 4K input image. This configuration supports high resolution and high frame rate input video streams, including both 2D and 3D direct inputs.	Two TDPIC cards

Input Configuration	Description	Requirements
Four-Port, Dual-Input 3D	May be used for Dual-Input 3D configurations. For information on the video quadrant mapping for the TDPIC four-point input configuration, see <a href="#">Four-port input video quadrant mappings</a> on page 30.	Four TDPIC cards
Single One-Port	Enables connection of one DisplayPort cable to the 1-IN input of a TDPIC card (any slot). In this configuration the DisplayPort input supplies the entire video raster.	One TDPIC card
One-Port, Dual-Input 3D	May be used for Dual-Input 3D configurations.	One or two TDPIC cards



For limitations of one card use for One-Port Dual-Input 3D, see [D4KLH60 signal connectivity](#) on page 50 and [Mirage 4KLH signal connectivity](#) on page 50.



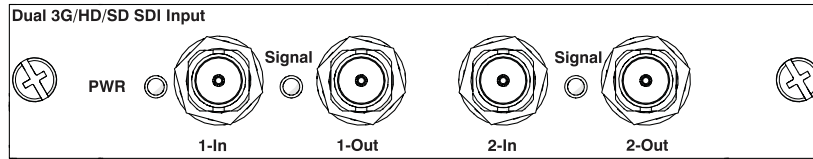
## Connect a video source via 3G-SDI

The 3G Input Card (3GIC) accepts digital video data from HD- and 3G-SDI (Serial Digital Interface) sources. Various input configurations are supported.

Input Configuration	Description	Requirements
Four-Port	Enables connection of four SDI cables to two 3GIC cards (using the 1-IN and 2-IN inputs of two cards in slots 1 and 2, or in slots 3 and 4). Each SDI input supplies one quadrant of a 4K input image. This configuration supports high resolution and high frame rate input video streams, including both 2D and 3D direct inputs.	Two 3GIC cards
Four-Port, Dual-Input 3D	May be used for Dual-Input 3D configurations. For information on the video quadrant mapping for the 3GIC four-point input configuration, see <a href="#">Four-port input video quadrant mappings</a> on page 30.	Four 3GIC cards
Single One-Port	Enables connection of one SDI cable to the 1-IN input of a 3GIC card (in any slot). In this configuration the SDI input supplies the entire video raster.	One 3GIC card
One-Port, Dual-Input 3D	May be used for Dual-Input 3D configurations.	One or two 3GIC cards



3GIC does not support 120 Hz framerate. For limitations of one-card use for One-Port Dual-Input 3D, see [D4KLH60 signal connectivity](#) on page 50 and [Mirage 4KLH signal connectivity](#) on page 50.



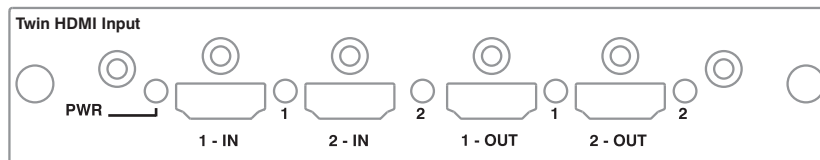
## Connect a video source using HDMI

The Twin HDMI Input Card (THIC) accepts digital video data from HDMI sources. Various configurations are supported.

Input Configuration	Description	Requirements
Four-Port	Enables connection of four HDMI cables to two THIC cards (using the 1-IN and 2-IN inputs of two cards in slots 1 and 2, or in slots 3 and 4). Each HDMI input supplies one quadrant of a 4K input image. This configuration supports high resolution and high frame rate input video streams, including both 2D and 3D direct inputs. Maximum framerate is 60 Hz.	Two THIC cards
Four-Port, Dual-Input 3D	May be used for Dual-Input 3D configurations. For information on the video quadrant mapping for the THIC four-point input configuration, see <a href="#">Four-port input video quadrant mappings</a> on page 30. Maximum framerate is 120 Hz.	Four THIC cards
Single One-Port	Enables connection of one HDMI cable to the 1-IN input of a THIC card (in any slot). In this configuration, the HDMI input supplies the entire video raster. Maximum framerate is 60 Hz.	One THIC card
One-Port, Dual-Input 3D	May be used for Dual-Input 3D configurations. Maximum framerate is 120 Hz.	One or two THIC cards



For limitations of one-card use for One-Port Dual-Input 3D, see [D4KLH60 signal connectivity](#) on page 50 and [Mirage 4KLH signal connectivity](#) on page 50.



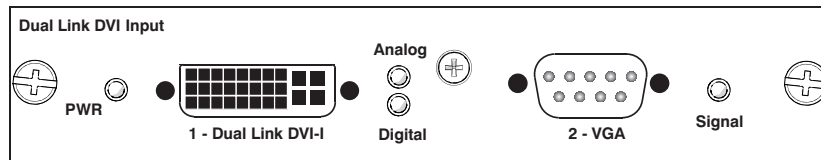
## Connect a video source via DVI

The Dual Link DVI Input Card (DDIC) accepts digital video data from DVI sources. Various input configurations are supported; however, the VGA port is not supported.

Input Configuration	Description	Requirements
Four-Port	Enables connection of four DVI cables to four DDIC cards. Each DVI input supplies one quadrant of a 4K input image. This configuration supports high resolution and high frame rate input video streams.	Four DDIC cards
Single One-Port	Enables connection of one DVI cable to the DVI input of a DDIC card (in any slot). In this configuration, the DVI input supplies the entire video raster.	One DDIC card
One-Port, Dual-Input 3D	May be used for Dual-Input 3D configurations.	Two DDIC cards



Only one Four-Port input configuration is available for DVI inputs. For information on the video quadrant mapping for the DDIC four-point input configuration, see [DDIC card](#) on page 31.



## Four-port input video quadrant mappings

Video quadrant mapping can change depending on the type of cards used for the Four-Port input configurations.

### 3GIC, TDPIC, THIC cards

The following table shows the video quadrant mappings for the 3GIC, TDPIC and THIC Four-Port input configurations:

Four-Port Input Configuration (1)		
Slot 1	1-In	Top left
Slot 1	2-In	Bottom left
Slot 2	1-In	Top right
Slot 2	2-In	Bottom right
Four-Port Input Configuration (2)		
Slot 3	1-In	Top left

Slot 3	2-In	Bottom left
Slot 4	1-In	Top right
Slot 4	2-In	Bottom right

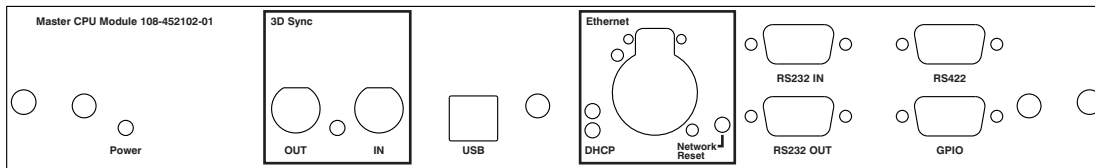
### DDIC card

The following table shows the video quadrant mappings for the DDIC Four-Port input configuration:

Four-Port Input Configuration		
Slot 1	1-Dual Link DVI-I	Top left
Slot 2	1-Dual Link DVI-I	Top right
Slot 3	1-Dual Link DVI-I	Bottom left
Slot 4	1-Dual Link DVI-I	Bottom right

## Connect devices to the 3D sync ports

The 3D Sync Input and Output ports located on the MCPU faceplate provide a convenient method for interfacing the projector to the 3D stereo projection system. The 3D Sync Input should be connected to the 3D video source for synchronization of the left eye/right eye frames. The 3D Sync Output is available for control of an IR Emitter for active glasses or a polarization device for passive glasses.



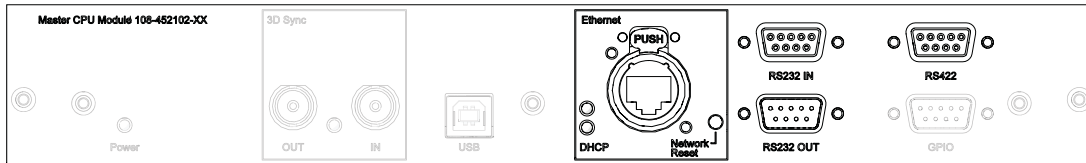
## Connect a computer or server

To communicate with a remote computer, server, or an existing network, use an RJ45 cable to connect the Ethernet hub or switch to the Ethernet port, located on the projector MCPU faceplate. When using the Christie serial protocol over Ethernet, connect to port 3002.

For applications or equipment with serial connectors, use the Christie-proprietary serial protocol to communicate with the RS422 port or the RS232 ports on the MCPU faceplate.

### NOTICE

The RS232 port located on the MCPU faceplate uses Christie-proprietary protocol and is intended for Christie accessories or automation controllers only. Failure to comply may result in equipment damage.



## Ethernet Setup

Ethernet is setup to obtain an IP address automatically if a DHCP server is on the network. To modify IP settings, or manually enter an address:

1. Tap **Menu Tab** > **Configuration** > **Ethernet Settings** > **Modify IP Settings**.
2. Set the network information for the projector:
  - To obtain information automatically from the network, tap **Automatic**.
  - To manually enter the network information, tap **Manual** and enter the **IP Address**, **Subnet Mask** and **Gateway** (optional).
3. Click **OK**.



# View 3D Content

This section provides information and procedures for setting up and managing 3D presentations.

## Set up Mirage 4KLH projectors for 3D

The Mirage projector is capable of displaying stereoscopic 3D video sources, relying on additional hardware (stereo emitters and glasses) to complete the display system.

Images generated from a stereo 3D video source consist of a series of images (frames) that alternate quickly between two slightly different viewpoints, corresponding to our left and right eyes. When these frames are displayed fast enough and viewed with special glasses synchronized to the left/right (L/R) changes, the resulting image appears with the same depth and perspective sense in the real world.



The type of 3D glasses can be active or passive stereo depending on the type of stereo controllers and screen used.

## 3D requirements

Stereo 3D applications require a stereo 3D-capable source, special hardware and software setups, and the projector's 3D Settings menu option to control the projector's processing, synchronization, and displaying of the stereoscopic 3D source material.

### Hardware requirements

Note the following hardware requirements for stereo 3D applications:

- Christie Digital Systems Mirage 4KLH Series projector
- 3D stereo sync cable (for Direct-Input 3D)
- A source, usually a computer with a 3D graphics card(s)
- Emitter for controlling active shutter glasses

or

A qualified device that mounts in front of the lens of the project to process the light from the lens into a passive polarized light. Contact your Immersive dealer for more information.

### Software and content requirements

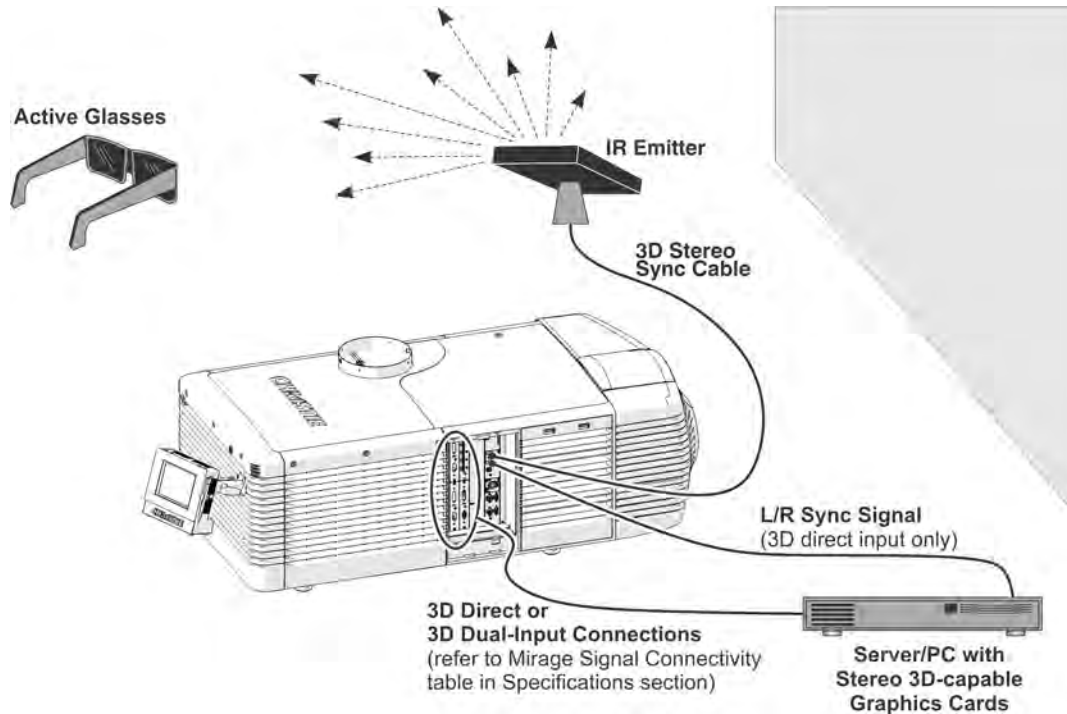
Note the following software and content requirements for stereo 3D applications:

- Any 3D computer software application that supports 3D stereo on a supported computer(s) with associated graphic cards (suggested cards include AMD or NVIDIA)

- A video stream from a video source prepared to be sequential content (for Direct-Input 3D) or two video streams from a video source that has been prepared to be supplied left eye and right eye concurrently and frame locked (Dual-Input 3D)

## Active stereo 3D configuration

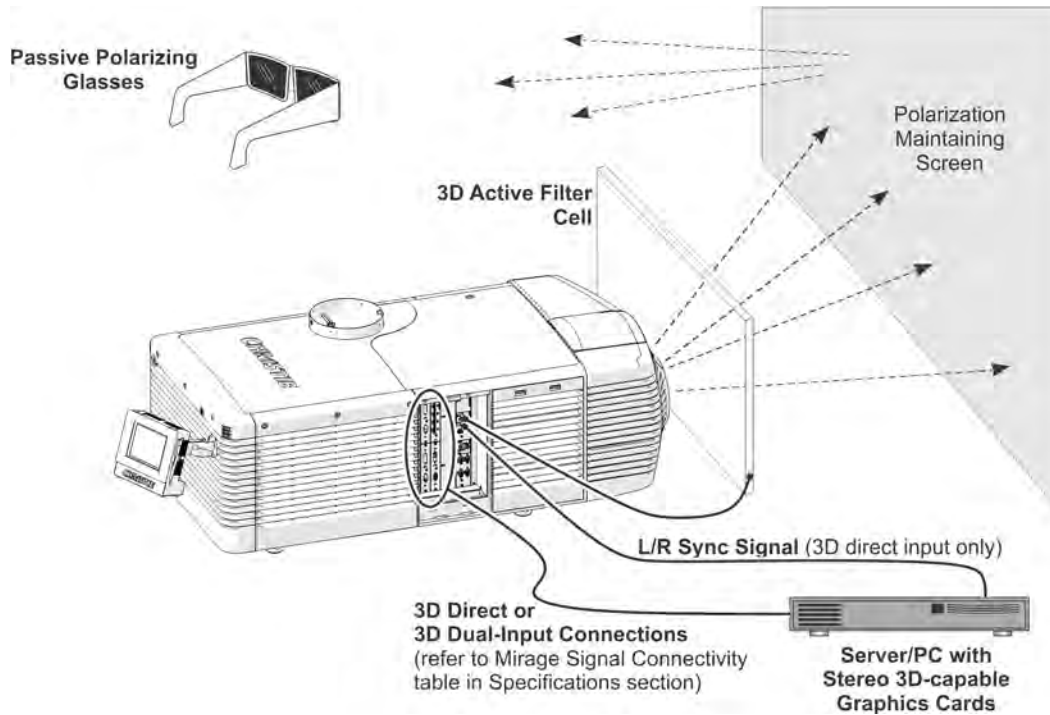
The following diagram shows the typical hardware configuration for active stereo 3D systems:



In response to the 3D Sync Out signal from the projector, the IR emitter emits an infrared signal to a receiver in the active 3D shutter glasses. This synchronizes the active glasses to alternatively open and close for the active stereo 3D applications.

## Passive stereo 3D configuration

The following diagram shows the typical hardware configuration for passive stereo 3D systems:



For operation with passive glasses, a 3D polarization filter is placed in front of the lens and is synchronized to the projected frames with the 3D Sync Out signal.

## 3D system timing

Consult the documentation for your glasses or polarization filter and keep their specifications in mind when configuring the projector for 3D operation. The projected video must be optimized for the glasses' shutter speed or polarization filter performance to prevent obvious "ghosting" of the video content (known as cross-talk in stereo 3D applications) or other more subtle color artifacts. Visual performance can be optimized by adjusting the Dark Interval and the 3D Sync Delay settings.

## 3D input video configurations

The stereo 3D input video stream may be supplied from the video server to the projector in two configurations: Direct-Input 3D or Dual-Input 3D.

Configuration	Description
Direct-Input 3D	<p>In this configuration a single video stream is provided by the video server, with the left eye and right eye frames supplied as alternate frames within the video stream. A 3D Input Sync may be used to identify the left eye frames.</p> <p>The Direct-Input 3D video stream may be supplied by either a Four-Port input video configuration (such as four cables each supplying one quadrant of the image) or an One-Port input video configuration (such as one cable supplying the entire frame).</p>
Dual-Input 3D	<p>In this configuration two video streams are provided by the video server, with the left eye supplied by one stream and the right eye supplied by the other. The video streams are frame locked and supplied concurrently.</p> <p>The Dual-Input 3D video streams may be supplied by either two Four-Port input video configurations (such as four cables each supplying one quadrant of the image for each eye, with a total of eight cables) or two One-Port input video configurations (such as one cable supplying the entire frame for each eye, with a total of two cables).</p>

## Set up a single Mirage 4KLH to display 3D content

The projector must be installed correctly to display 2D content (optically aligned, focused, and so on) before completing the following steps to display the 3D content:

1. Confirm the emitter setup.
2. Configure the projector for the 3D source.

### Confirm the emitter setup

1. To set the 3D output to emitter, go to **Main menu > Image Settings > 3D Sync Output** and select **To Emitter**.
2. To enable the 3D test pattern, go to **Main menu > Image Settings** and select **3D Test Pattern**.
3. To configure the dark interval so the amount of dark time aligns with the amount of time required for the glasses to switch, go to **Main menu > Image Settings > Dark Interval** and adjust the dark interval as required.
4. View the displayed test pattern. If you can see both Ls and Rs with both eyes, increase the dark interval until Ls are only visible to the left eye and Rs are only visible to the right eye.
5. Optionally, adjust the 3D Sync delay as necessary.

This adjusts the timing of the sync pulse in relation to the dark time transition on the DMDs. Use the default value of 0 as a starting point.

## Configure the projector for the 3D source

1. Select the channel (from the Home tab) best suited for the 3D source.
2. To select the correct EDID timing, go to **Main menu > Image Settings > EDID Timing Select** and select the required EDID timing.
3. Connect all the required cables between the 3D source and the projector.
4. Configure your 3D source.

# Laser Bank Control Application

The laser bank control application manages the operation of the laser modules.

## Start the laser bank control application

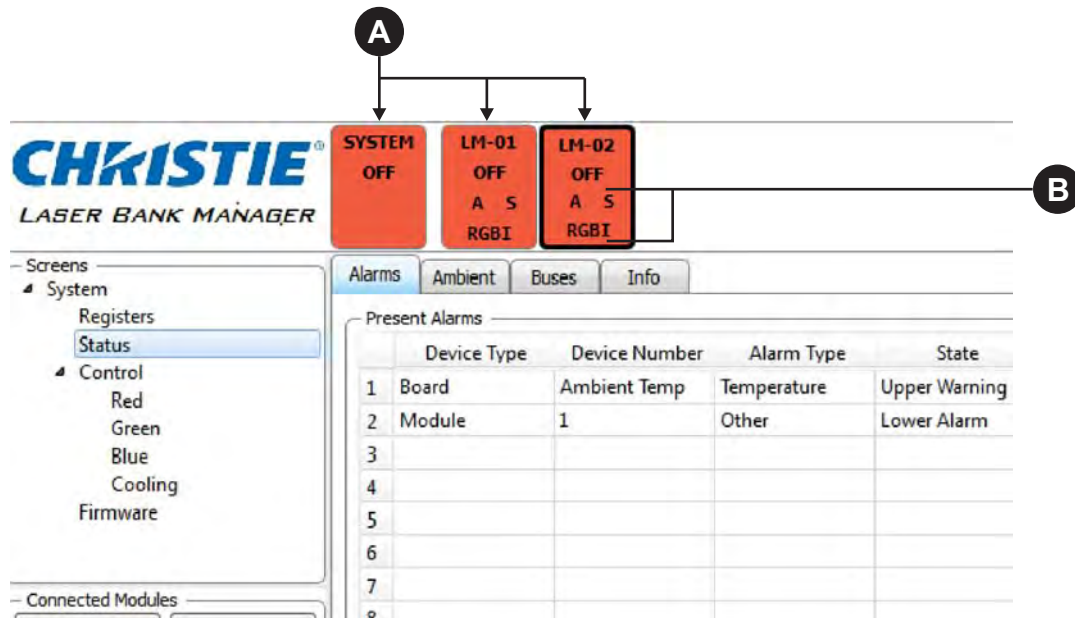
The laser bank control application automatically starts when the laser bank manager starts.

1. If you need to restart it, click **Start > Laser Bank Control Application**.

You are automatically logged in as Operator, which does not require a password.

## Check laser module status

2. View the quick status panels (A).



Normally, the quick status panels have a green background. A yellow background indicates a warning, and a red background indicates one or more alarms.

3. Check the alarm codes (B).

Code	Description
V	Bus voltages
A	Ambient temperature
F	Fans
C	Chiller

Code	Description
S	File System (SD card)
E	Red enclosure
R	Red laser
G	Green laser
B	Blue laser
I	Interlock
P	Power-up

4. To open a status pane for a particular laser module, click the corresponding quick status panel.
5. To view the alarm type and state, click the **Alarms** tab.
6. To view the current ambient temperature and warning and alarm thresholds, click the **Ambient** tab.
7. To view bus voltage levels, click the **Buses** tab.
8. To view laser module build, software, and use data, click the **Info** tab.

## Retrieve log file

1. Under Screens, click **System > Status**.
2. in the Logs group in the Start date list, select the earliest day you want data from.
3. In the End date list, select the last day you want data from.
4. Click **Get Logs**.

## Change user levels

1. Click System and under Access Level, click **Change**.
2. Select the user level you want.

User	Permissions
Operator	View laser module status and retrieve log files.
Advanced	Create and save configurations for channels. Plus actions from lower level.
Administrator	Deactivate and activate a laser device. Plus actions from lower levels.
Service	Change alarm thresholds, laser output. Disable and enable two of the five fans. Update firmware. Change some register settings. Plus actions from lower level.
Engineering	Christie Digital access only.
Factory	Christie Digital access only.
Status	Unused.

User	Permissions
SNMP	Unused.

3. If you are changing to a higher user level, type your password and press Enter.  
If you are changed to a lower user level, you do not have to enter your password.

## Create a channel configuration

You must be logged in as Advanced or higher to create a configuration.

1. Under screens, click **System**.
2. To include a laser module, in the appropriate laser module group, select **Included**.
3. To exclude a laser module, in the appropriate laser module group, clear **Included**.
4. To save the configuration, in the Configure Management group, click **Save**.

## Log out of your current user level

When you log out of your current user level, you are automatically logged in as Operator. When you are logged in as Operator you cannot log off.

1. Click system and under Access Level click **Log off**.



# Maintenance

This section provides information and procedures for performing projector maintenance. Read through this section in its entirety before performing maintenance activities. When you perform projector maintenance, obey all warnings and precautions.

## Shut down for maintenance

Perform these steps before beginning any inspection or maintenance procedures on the projector.

1. If the projector is operating, turn it off.
2. Disconnect the projector from AC power.
3. Rotate the Beam Stop to **CLOSED**.
4. Remove the key from the Laser Rack Key switch.

## Check the coolant level



The coolant must be refilled by a qualified service technician. Failure to comply could result in minor or moderate injury.

The liquid cooling system keeps the digital micromirror device (DMD) heat sinks cool. Check the coolant level every six months.

1. Remove the rear top cover.
2. Check the coolant level in the coolant reservoir.
3. If the coolant level is below the minimum level indicator, contact your Christie service technician to refill the coolant.

## Inspect and Clean Optics

Unnecessary cleaning of optics can increase the risk of degrading delicate coatings and surfaces. If you are not a qualified service technician, you can only inspect and clean the lens. Do not perform maintenance on other optical components. Check these components periodically in a clean, dust-free environment using a high-intensity light source or flashlight. Clean them only when dust, dirt, oil, fingerprints or other marks are obvious on the projected image. Never touch an optical surface with your bare hands. Always wear latex lab gloves.

These are the recommend tools for removing dust or grease:

- Powder free latex gloves
- Soft camel-hair brush
- Dust-free blower - air bulb or a canned air duster without additives such as Techspray 1671-10S Ultra-Pure Duster
- Lint-free lens tissue, such as Lensx 90 tissue or Newport Optics cleaning tissue

- Lens cleaning solution and a microfiber cloth (for the lens only)
- Isopropyl Alcohol Reagent Grade (ACS) 99.9%
- Acetone Reagent Grade (ACS)
- Optical grade cotton swabs with wooden stems
- Sticklers Fiber Optic Cleaner (can be used on all optical components)
- A bright, portable illumination device such as an LED flashlight

## Clean the Lens

A small amount of dust or dirt on the lens has minimal effect on image quality-to avoid the risk of scratching the lens, clean the lens only if absolutely required.

### Remove Dust

1. Brush most of the dust off with a camelhair brush or use a dust-free blower.
2. Fold a microfiber cloth and wipe the remaining dust particles off the lens with the smooth portion of the cloth that has no folds or creases. Do not apply pressure with your fingers. Instead, use the tension in the folded cloth to remove the dust.
3. If significant dust remains on the lens surface, dampen a clean microfiber cloth with lens cleaning solution and wipe gently until clean.

### Remove Fingerprints, Smudges, or Oil

1. Brush most of the dust off with a camelhair brush or use a dust-free blower.
2. Wrap a lens tissue around a swab and soak it in lens cleaning solution. The tissue should be damp but not dripping.
3. Gently wipe the surface using a figure eight motion. Repeat until the blemish is removed.

## Inspect the Card Cage Filter

Use only high efficiency Christie approved filters. Never operate the projector without the filter installed.

You should check the condition of the card cage air filter monthly. Clean or replace the card cage air filter sooner if you are operating the projector in a dusty or dirty environment. The filter is located on the left side of the projector behind the air filter cover.

1. Loosen the 2 captive screws on the bottom of the filter cover.
2. Pull the cover out and down.
3. Slide the air filter out and inspect it.
4. If the filter appears dirty and you cannot see through it, replace it with a new paper filter, or clean it if it is a washable filter. See [Cleaning a Washable Filter](#) on page 43.

If the filter appears clean, continue to step 4.

5. Replace the air filter with the airflow indicator facing toward the projector.
6. Install the air filter cover by inserting the 2 bottom tabs and then pushing the cover closed.
7. Tighten the 2 captive screws.

## Cleaning a Washable Filter

If the amount of dirt on the filter is minimal, use a vacuum or compressed air to remove it. If you use compressed air, the air must move through the filter in the opposite direction of the air flow indicator on the side of the filter.




### WARNING

The installation of a filter that has not been allowed to dry completely can cause an electrical short and damage the projector.

1. Hold the filter on an angle under warm running water so the water flows through the filter in the opposite direction of the air flow indicator on the side of the filter.
2. Rinse the filter thoroughly.
3. Submerge the filter for a minimum of 30 minutes in a container of warm water and two tablespoons of mild detergent or liquid dish soap.  
  
If the filter is extremely dirty, move the filter from side to side occasionally, or remove the excess dirt by brushing both sides of the filter with a soft brush.
4. Rinse the filter thoroughly by holding it on an angle under cool running water. The air flow arrow on the side of the filter should face down.
5. Repeat steps 3 and 4 if the filter still appears dirty.
6. Shake the filter over a container until most of the water is removed.
7. Place the filter on its edge on a flat, stable surface and allow it to dry thoroughly.
8. To confirm that the filter is dry, place it over a dry paper towel and shake it. If the paper towel remains dry, the filter can be installed in the projector.
9. Record the date the filter was cleaned.
10. Replace the filter following the instructions for the specific filter.

## Replace the Lens

The lens seals the projection head, preventing contaminants from entering the main electronics area. Do not operate the projector without a lens installed. Install a lens plug when you install or transport the projector.

1. Tap and hold the red power button  on the TPC **Main** panel to turn the projector off.
2. Disconnect the projector from AC power or turn the circuit breaker off.
3. Install the lens cap and turn the lens clamp to the open position.
4. If necessary, remove the 2 cap screws securing the lens to the lens mount using a hex key.

5. Pull the lens out of the lens mount and then install a small lens cap on the rear of the lens.
6. Remove the small rear cap from the new lens. Keep the front cap on.
7. Align the tabs on the lens plate with the lens mount. Insert the lens until it connects with the magnets on the mount. When the lens contacts the magnetic plates it is seated correctly.
8. Secure the lens clamp by rotating it clockwise.
9. Tighten the lens mount cap screws for added stability.
10. Remove the lens cap from the front of the lens.

# Troubleshooting


This section provides information and procedures for resolving common issues. If you cannot resolve an issue, contact Christie support. So that a support representative can better assist you, have the model and serial number of your projector ready.

## Projector functionality

Issue	Resolution
Projector does not turn on	<ul style="list-style-type: none"> <li>• Verify the power cord is connected to the projector and the AC power supply correctly.</li> <li>• Verify the touch panel controller (TPC) is on and the LEDs on the input panel are illuminated. If the TPC is off and there are no LEDs illuminated, verify the AC outlet to which the projector is connected is working and the TPC is connected to the projector. If the AC outlet is working and the TPC is connected to the projector, contact Christie support.</li> <li>• If the TPC is connected to the projector and the LEDs on the input panel are illuminated, on the TPC, verify in the <b>Operational Status</b> region of the Main panel does not indicate a PIB failure.</li> </ul>
Touch panel controller	<ul style="list-style-type: none"> <li>• Make sure the TPC is connected to the projector.</li> <li>• If the TPC fails to initialize, make sure the compact flash on the left side is installed correctly.</li> <li>• If the TPC fails to initialize, restart the projector.</li> <li>• If the location of button presses on the screen are not interpreted correctly, the TPC screen may need recalibrating. Tap <b>Menu &gt; Administrator Setup &gt; Preferences</b>. Tap <b>Calibrate Screen</b> and follow the on screen instructions.</li> </ul>
Cannot establish communication with projector	<p>Verify all input devices have the same subnet mask and gateway and unique IP addresses.</p>
Projector does not move from standby to full power mode	<ul style="list-style-type: none"> <li>• Check the touch panel controller (TPC) for error messages.</li> <li>• If a failure with PIB communications exists, reseal the board.</li> <li>• Check the Ethernet status LED on the rear of the TPC.</li> <li>• Verify that the internal fans are operating.</li> <li>• Look through the service panel and verify that the green LED is lit. This indicates the LVPS is operating.</li> <li>• Check all of the harness connections between LVPS and backplane. Pay particular attention to the small, white connector on the LVPS.</li> <li>• Replace the LVPS.</li> <li>• Check the interlocks. See <a href="#">Interlock cannot be reset</a> on page 48.</li> </ul>
DMD over-temperature warning	<ul style="list-style-type: none"> <li>• In the left pane, tap <b>Menu &gt; Status &gt; Temperatures</b>. Verify if the DMD temperatures are too high. If the temperatures are too high, turn the lasers off and allow the cooling fans to cool the projector.</li> <li>• Check the condition of the air filters and clean or replace them if they appear to be dirty.</li> <li>• Verify that all fans are operating.</li> <li>• Ensure DMD coolant hoses are plugged in.</li> <li>• Ensure coolant level is full.</li> </ul>

## Display issues

Issue	Resolution
No image appears	<ul style="list-style-type: none"> <li>• Make sure the lasers are armed.</li> <li>• Make sure the douser is open.</li> <li>• Make sure a white test pattern is selected.</li> <li>• Make sure the service doors are closed.</li> <li>• Verify the marriage icon on the main window of the touch panel controller (TPC) is green.</li> </ul>
Flicker, shadows, or dimness	<ul style="list-style-type: none"> <li>• Ensure the douser is open.</li> <li>• Fold mirror misalignment. Contact your Christie accredited service technician to resolve the issue.</li> <li>• Integrator rod misalignment. Contact your Christie accredited service technician to resolve the issue.</li> </ul>
Blank screen, no display of cinema image	<ul style="list-style-type: none"> <li>• Ensure the lens cap is not on either end of the lens.</li> <li>• Ensure the laser modules are armed.</li> <li>• Confirm all power connections are still OK.</li> <li>• Ensure the douser is <b>open</b> by verifying the state of the douser on Main panel.</li> <li>• Ensure any test pattern other than the full black test pattern displays properly.</li> <li>• Verify the correct display file is selected.</li> <li>• For cinema connections, verify the correct port is selected.</li> </ul>
Severe motion artifacts	Verify if a synchronization problem exists with reversed 3-2 pull-down in the 60Hz-to-24Hz film-to digital conversion and correct it at the source.
Image appears vertically stretched or squeezed into the center of the screen	Open the Source File Setup window and verify the resolution and aspect ratio settings. Open the Screen File Setup window and verify the lens factor settings.
Inaccurate display colors	Tap <b>Menu &gt; Channel Setup</b> . Tap <b>Config 1</b> in the left pane and verify the correct value is selected in the <b>PCF</b> list. Tap <b>Config 2</b> in the left pane and verify the correct value is selected in the <b>Color Space</b> field.
Display is not rectangular	<ul style="list-style-type: none"> <li>• Verify the projector is level and the lens surface and screen are parallel to one another.</li> <li>• Tap <b>Menu &gt; Advanced Setup &gt; Screen File Setup</b> and verify the settings for the screen file are correct.</li> </ul>
Display is noisy	<ul style="list-style-type: none"> <li>• Verify the cables connecting the input device to the projector meet the minimum requirements and are undamaged.</li> <li>• Add signal amplification or conditioning if the distance between the input device and the projector exceeds 25 feet.</li> <li>• Turn the projector off and then on again.</li> </ul>
Display has suddenly stopped	<ul style="list-style-type: none"> <li>• Ensure the lasers were not turned off from the laser bank manager.</li> <li>• Check the interlocks. See <a href="#">Interlock cannot be reset</a> on page 48.</li> <li>• Turn off the projector and unplug the power cord from the power source. Plug the projector power cord into a power source and turn the projector on.</li> </ul>

Issue	Resolution
The projector is on, but alternate content does not display	<ul style="list-style-type: none"> <li>• Make sure the lens cover is removed from the lens.</li> <li>• Make sure the lasers are armed.</li> <li>• Make sure the douser is open.</li> <li>• On the main TPC screen, tap .</li> <li>• Tap <b>Menu &gt; Channel Setup</b>. Verify the correct channel is selected and the settings are correct.</li> <li>• Ensure an active source is connected properly. Check the cable connections and make sure the alternative source is selected.</li> <li>• Verify you can select test patterns. If you can, check your source connections again.</li> </ul>
The display is jittery or unstable	<ul style="list-style-type: none"> <li>• Verify that the input device is connected properly. If the input device is not connected properly, the projector repeatedly attempts to display an image.</li> <li>• The horizontal or vertical scan frequency of the input signal may be out of range for the projector.</li> <li>• The sync signal may be inadequate. Correct the source problem.</li> </ul>
Portions of the display are cut off	If you have resized the image, adjust the resizing settings until the entire image is visible and centered.
Inconsistent picture quality	Verify the quality of the signal from the input source.

## Laser module functionality

Issue	Resolution
Lasers fail to turn on	<ul style="list-style-type: none"> <li>• If you have just turned on the projector, wait approximately five minutes for the laser modules to warm up and the lasers to arm.</li> <li>• Check the status of the interlocks. In the left pane, tap <b>Menu &gt; Status &gt; Interlocks</b>. If the status is Critical or Unknown, press <b>Manual Reset</b> on the projector to reset the interlocks.</li> <li>• Check the status of the laser bank manager. In the left pane, tap <b>Menu &gt; Status &gt; Laser Info</b>. If the Laser Bank Manager Status in the right pane is not Online, ensure the laser system network switch is on and an Ethernet cable is attached from the laser system network switch to the TPC, to every laser module and to the laser bank manager. Check the status of the laser modules on the laser bank control application.</li> </ul>

Issue	Resolution
Interlock cannot be reset	<ul style="list-style-type: none"> <li>• If the projector is in standby, check the status of the RGB Sensor board. In the left pane, tap <b>Menu &gt; Status &gt; RGB Sensor</b>. If it is offline, press and hold the power button to put the projector in power on mode and press <b>Manual Reset</b> on the projector. Contact Christie support.</li> <li>• Make sure the wall breaker providing AC to the Laser Rack is on.</li> <li>• Make sure the laser system network switch in the Laser Rack is on.</li> <li>• Make sure the laser beam stop is in the <b>open</b> position.</li> <li>• Make sure the key switch on the Laser Rack is in the <b>ON</b> position.</li> <li>• Make sure the emergency stop buttons on the projector and the Laser Rack are released.</li> <li>• Make sure a fiber optic cable is properly attached to each laser module and to the projector.</li> <li>• Make sure the interlock cables to the <b>Interlock In</b> and <b>Interlock Out</b> connectors on each laser module are properly attached. Ensure the interlock cable is properly attached to the <b>Laser Interlock</b> connector on the projector.</li> <li>• Make sure one end the 25-pin interlock cable is properly attached to the interlock harness on the Laser Rack and the other end to the <b>Laser Rack</b> connector on the projector.</li> </ul>
Interlock opens	<ul style="list-style-type: none"> <li>• Check the DMD temperatures. See <a href="#">DMD over-temperature warning</a> on page 45.</li> <li>• Make sure that the lasers were not turned off from the laser bank control application.</li> <li>• Check the interlocks. See <a href="#">Interlock cannot be reset</a> on page 48.</li> </ul>



# Projector Specifications

This section provides detailed specifications for the projector head.

## Power requirements

Item	Description
Voltage	100 -240 VAC
Maximum Current	10 A
Line Frequency	50 - 60 Hz
Inrush Current	45 A maximum

## D4KLH60 signal connectivity

Input Configuration	Input Format	Frame Rate (Hz)	Interface	Cards	Cables	RGB/4:4:4 8-bit	RGB/4:4:4 10-bit	RGB/4:4:4 12-bit	4:2:2 8-bit	4:2:2 10-bit	4:2:2 12-bit
Four-Port	4K, QHD	24, 25, 30, 48, 50, 60	DisplayPort	2x TDPIC	4	X	X		X	X	X
Four-Port	4K, QHD	24, 25, 30, 48, 50, 60	HDMI	2x THIC	4	X	X	X	X	X	X
Four-Port	4K, QHD	24, 25, 30, 48, 50, 60	3G-SDI	2x3GIC	4					X	
Four-Port	4K, QHD	24, 25, 30, 48, 50, 60	DVI (Single Link)	4x DDIC	4	X					
One-Port	2K, HD	24, 25, 30, 48, 50, 60	DisplayPort	1x TDPIC	1	X	X		X	X	X
One-Port	2K, HD	24, 25, 30, 48, 50, 60	HDMI	1x THIC	1	X	X	X	X	X	X
One-Port	2K, HD	24, 25, 30	3G-SDI	1x 3GIC	1	X	X	X	X	X	X
One-Port	2K, HD	48, 50, 60	3G-SDI	1x 3GIC	1					X	
One-Port	2K, HD	24, 25, 30, 48, 50, 60	DVI (Single Link)	1x DDIC	1	X					

## Mirage 4KLH signal connectivity

2D/3D	Input Configuration	3D Type	Input Format	Frame Rate (Hz)	Interface	Cards	Cables	RGB/4:4:4 8-bit	RGB/4:4:4 10-bit	RGB/4:4:4 12-bit	4:2:2 8-bit	4:2:2 10-bit	4:2:2 12-bit
3D	Four-Port	Direct	4K, QHD	120	DisplayPort	4x TDPIC	4	X	X				
3D	Four-Port	Direct	4K, QHD	120	DVI (Dual Link)	4x DDIC	4	X					
3D	Four-Port	Dual-Input	4K, QHD	60	DisplayPort	4x TDPIC	8	X	X		X	X	X

2D/3D	Input Configuration	3D Type	Input Format	Frame Rate (Hz)	Interface	Cards	Cables	RGB/4:4:4 8-bit	RGB/4:4:4 10-bit	RGB/4:4:4 12-bit	4:2:2 8-bit	4:2:2 10-bit	4:2:2 12-bit
3D	Four-Port	Dual-Input	4K, QHD	60	HDMI	4x THIC	8	X	X	X	X	X	X
3D	Four-Port	Dual-Input	4K, QHD	60	3G-SDI	4x 3GIC	8					X	
3D	Four-Port	Direct	4K, QHD	60	DisplayPort	2x TDPIC	4	X	X		X	X	X
3D	Four-Port	Direct	4K, QHD	60	HDMI	2x THIC	4	X	X	X	X	X	X
3D	Four-Port	Direct	4K, QHD	60	3G-SDI	2x 3GIC	4					X	
3D	Four-Port	Direct	4K, QHD	60	DVI (Single Link)	4x DDIC	4	X					
3D	One-Port	Dual-Input	2K, HD	60	DisplayPort	1x TDPIC	2	X	X		X	X	X
3D	One-Port	Dual-Input	2K, HD	60	HDMI	1x THIC	2	X	X	X	X	X	X
3D	One-Port	Dual-Input	2K, HD	60	3G-SDI	1x 3GIC	2					X	
3D	One-Port	Dual-Input	2K, HD	60	DVI (Single Link)	2x DDIC	2	X					
3D	One-Port	Direct	2K, HD	120	DisplayPort	1x TDPIC	1	X	X				
3D	One-Port	Direct	2K, HD	120	DVI (Dual Link)	1x DDIC	1	X					
2D	Four-Port		4K, QHD	120	DisplayPort	4x TDPIC	4	X	X				
2D	Four-Port		4K, QHD	120	DVI (Dual Link)	4x DDIC	4	X					
2D	One-Port		2K, HD	120	DisplayPort	1x TDPIC	1	X	X				
2D	One-Port		2K, HD	120	DVI (Dual Link)	1x DDIC	1	X					

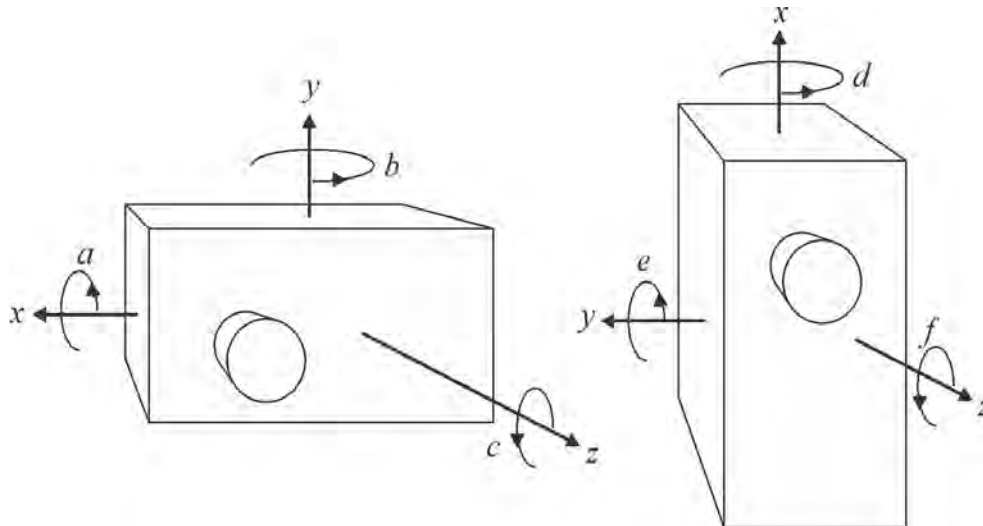
- 4K = 4096 x 2160
- QHD = 3840 x 2160
- 2K = 2048 x 1080
- HD = 1920 x 1080

## Physical specifications

Item	Description
Size (L x W x H) (without front shroud)	(without lens mount, stack, and feet) 1097 mm (43.2 inches) x 644 mm (25.4 inches) x 432 mm (17.0 inches)
	(includes lens mount, stack, and feet) 1211 mm (47.7 inches) x 644 mm (25.4 inches) x 480 mm (19.0 inches)
	Shipping (includes skid) 1448 mm (57 inches) x 914 mm (36 inches) x 711 mm (28 inches)
Size (L x W x H) (with front shroud)	(includes front shroud, stack, and feet) 1330 mm (52.4 inches) x 644 mm (25.4 inches) x 480 mm (19.0 inches)
	Front shroud is shipped separately
Weight (without front shroud)	102 kg (224 pounds)
	Shipping (includes packaging) 133 kg (294 pounds)
Weight (with front shroud)	104 kg (230 pounds)
	Shipping (includes packaging) 136 kg (300 pounds)

## Operating position

This diagram shows how the projection can be positioned.



Angle	Range
a	-105 degrees to 105 degrees
b	360 degrees
c	15 degrees to -105 degrees
d	360 degrees
e	-105 degrees to 105 degrees
f	-15 degrees to 105 degrees

## Operating environment

Item	Description
Temperature	10 °C to 25 °C (50 °F to 77 °F)
Humidity (non-condensing)	20 % to 80 %

## Non-operating environment

Item	Description
Temperature	-20 °C to 60 °C (-4 °F to 140 °F)
Humidity (non-condensing)	0 % to 95 %

## Projection lens compatibility

Item	Description/Part Number
High Brightness Zoom Lenses (HB)	<ul style="list-style-type: none"> <li>• 25-1.45:1 (2K) / 1.13-1.31:1 (4K) (129-104106-xx)</li> <li>• 1.45-1.8:1 (2K) / 1.31-1.63:1 (4K) (129-105107-xx)</li> <li>• 1.8-2.4:1 (2K) / 1.63-2.17:1 (4K) (129-106108-xx)</li> <li>• 2.2-3.0:1 (2K) / 1.98-2.71:1 (4K) (129-107109-xx)</li> <li>• 4.3-6.0:1 (2K) / 3.89-5.43:1 (4K) (129-109101-xx)</li> <li>• 5.5-8.5:1 (2K) / 4.98-7.69:1 (4K) (129-110103-xx)</li> <li>• 3.0-4.3:1 (2K) / 2.71-3.89:1 (4K) (129-108100-xx)</li> </ul>
High Brightness Fixed Zoom Lenses (HB)	<ul style="list-style-type: none"> <li>• 0.8:1 (2K)/0.73:1 (4K) (113-104106-xx) [compromised image quality due to vignetting in corners]</li> <li>• 1:1 (2K)/0.9:1 (4K) (38-809071-xx)</li> <li>• 1:1 (2K)/0.9:1 (4K) matched pair (108-490104-01)</li> </ul>

## Accessories

### Standard

- Touch panel controller with interface cable
- Installation and User Guides
- Interconnect diagram
- Front shroud
- Motors and zoom kit for motorized lens mount
- Lock down screws for lens mount

### Optional

Item	Description/Part Number
Rack Stand	108-282101-xx
Bracket Foot Lock used with optional Rack Stand	116-100101-xx
TPC Remote Cable (30m)	003-111169-xx

### Third-party accessories

- 3D Equipment

## Replacement air filters

Item	Description/Part Number
LAD Filter	03-001982-5XP
Intake LE Filter	003-001184-XX
IOS Air Filter	003-003082-XX
Radiator Filter Washable	003-005009-XX

# Laser Module Specifications

This section provides detailed specifications for Christie laser modules. Due to continuing research, specifications are subject to change without notice.

## Power requirements.

Item	Description
Voltage	46 -53 VDC
Maximum Current	22 A

## Physical specifications

Item	Description
Size (L x W x H)	3800 mm (31.5 inches) x 443 mm (17.5 inches) x 130 mm (5.25 inches)
	Shipping (includes packaging)
	953 mm (37.5 inches) x 851 mm (33.5 inches) x 286 mm (11.25 inches)
Weight	32 kg (70 pounds)
	Shipping (includes packaging)
	46 kg (100 pounds)
Operating Position	Tilt of projection axis from horizontal ± 30 degrees maximum

## Operating environment

Item	Description
Temperature	10 °C to 25 °C (50 °F to 77 °F)
Humidity (non-condensing)	20 % to 80 %



## Non-operating environment

Item	Description
Temperature	-25 °C to 65 °C (-13 °F to 149 °F)
Humidity (non-condensing)	0 % to 95 %

## Accessories

### Included

- Ethernet cable
- Interlock cables

### Additional

- LM Rack (Full) P/N 146-110103-XX
- LM Rack (Half) P/N 146-104106-XX
- LM Rack (Full) Plenum P/N 146-109101-XX
- DC Power Harness
- Fiber Bundle
- Modular DC Power Supply

### Optional

- Air Filters
- Replacement Fan Pack

# Laser Rack Specifications

This section provides detailed specifications for the LM Rack (Full) and LM Rack (Half).

## Power requirements

One to four single phase circuits power the LM Rack (Full).

One to three single phase circuits power the LM Rack (Half).

Item	Description
Voltage	200 - 240 VAC
Maximum Current	24 A
Line Frequency	50 - 60 Hz

Two single phase circuits for the laser system network switch and the laser bank manager.

Item	Description
Voltage	100 - 240 VAC
Maximum Current	15 A
Line Frequency	50 - 60 Hz

# Physical specifications

## LM Rack (Full)

Item	Description
Length	with front plenum removed 1081.6 mm (42.58 inches)
	with front plenum installed 1375.6 mm (54.16 inches)
Width	without side duct installed 644 mm (25.83 inches)
	with side duct installed 744.6 mm (29.31 inches)
Height	without top duct installed 2196.6 mm (86.48 inches)
	with top duct installed 2296.6 mm (90.42 inches)
	with fiber optic bundle routed through top 2546.6 mm (100.26 inches)
Weight	with front plenum installed 299.8 kg (661 pounds)
	with front plenum removed 263.0 kg (580 pounds)
	with front plenum and rear door removed 257.1 kg (547 pounds)



The optional earthquake kit adds 10 mm (0.39 inches) to the height.

## LM Rack (Half)

Item	Description
Length	1081.6 mm (42.58 inches)
Width	without side duct installed 644 mm (25.83 inches)
	with side duct installed 744.6 mm (29.31 inches)

Item	Description
Height	without top duct installed 1529.8 mm (60.23 inches)
	with top duct installed 1629.8 mm (64.17 inches)
	with fiber optic bundle routed through top 1879.8 mm (74.01 inches)
Weight	204.1 kg (450 pounds)
	with rear door removed 193.7 kg (427 pounds)



The optional earthquake kit adds 10 mm (0.39 inches) to the height.

## Operating environment

Item	Description
Temperature	10 °C to 25 °C (50 °F to 77 °F)
Humidity (non-condensing)	20% to 80%

## Non-operating environment

Item	Description
Temperature	-25 °C to 65 °C (-13 °F to 149 °F)
Humidity (non-condensing)	0% to 95%

# Regulatory

This product conforms to the following regulations related to product safety, environmental requirements and electromagnetic compatibility (EMC). Due to continuing research, specifications are subject to change without notice.

## Safety

- CAN/CSA C22.2 No. 60950-1
- UL 60950-1
- IEC 60950-1
- EN60950

## Laser safety

- IEC 60825-1 (2007)
- FDA CDRH CFR 1040.10
- FDA CDRH CFR 1040.11

## Electro-magnetic compatibility

Item	Description
Emissions	<ul style="list-style-type: none"><li>• FCC CFR47, Part 15, Subpart B, Class A - Unintentional Radiators</li><li>• CAN ICES-3 (A) / NMB-3 (A)</li><li>• CISPR 22/EN 55022 Class A - Information Technology Equipment</li></ul>
Immunity	CISPR 24/EN55024 EMC Requirements - Information Technology Equipment

## Environmental

- EU Directive (2011/65/EU) on the restriction of the uses of certain hazardous substances (RoHS) in electrical and electronic equipment and the applicable official amendment(s).
- EU Regulation (EC) No. 1907/2006 on the registration, evaluation, authorization and restriction of chemicals (REACH) and the applicable official amendment(s).

- EU Directive (2012/19/EU) on waste and electrical and electronic equipment (WEEE) and the applicable official amendment(s).
- China Ministry of Information Industry Order No.39 (02/2006) on the control of pollution caused by electronic information products, hazardous substances concentration limits (SJ/T11363-2006), and the applicable product marking requirements (SJ/T11364-2006)

## Certification

The product is designed to comply with the rules and regulations required for the product to be sold in various regional markets, including USA/Canada, EU, Australia/New Zealand, Kuwait, China, Korea, Japan, Mexico, Ukraine, Russia, India, South Africa, and Saudi Arabia.

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